IN THE CLAIMS:

Please amend the claims as follows:

1. (previously canceled)

2. (previously canceled)

3. (previously canceled)

4. (previously canceled)

5. (previously canceled)

6. (previously canceled)

7. (previously canceled)

8. (previously canceled)

9. (previously canceled)

10. (previously canceled)

11. (previously canceled)

12. (previously canceled)

13. (previously canceled)

14. (previously canceled)

15. (previously canceled)

16. (currently amended) A process of forming an ultrafine crystal layer in a workpiece constituted by a metallic material, said process comprising:

performing a drilling operation on a machined surface of the workpiece using a drill, so as to impart a large local strain to the machined surface of the workpiece;

wherein said drilling operation using said drill causes the machined surface of the workpiece to be subjected to a

plastic working with a true strain of at least 1, such that said ultrafine crystal layer is formed in a surface layer portion of the workpiece that defines the machined surface of the workpiece;

wherein, in the drilling operation, when hardness H of the workpiece W is lower than 500 [Hv], a peripheral velocity V of the drill D is higher than (175 - H / 4) [m/min] and a feed amount of the drill per one revolution is smaller than ~~0.03 mm~~ 0.3 mm, and when the hardness H of the workpiece W is higher than 500 [Hv], the peripheral velocity V of the drill D is higher than 50 [m/min] and the feed amount of the drill D per one revolution is smaller than ~~0.03 mm~~ 0.3 mm; and

wherein said drilling operation using said drill is performed on the surface of the workpiece that is constituted by a steel material as the metallic material, with a material temperature at the machined surface of the workpiece being held in a range which is higher than an Ac1 transformation point of the steel material and lower than a melting point of the steel material.

17. (previously canceled)

18. (previously canceled)

19. (previously canceled)

20. (previously canceled)

21. (previously amended) The ultrafine crystal layer forming process according to claim 16, further comprising:

cooling the machined surface of the workpiece, after the drilling operation using the drill has been performed,

wherein the machined surface of the workpiece is cooled at a rate higher than a cooling rate that is required for hardening the workpiece.

22. (previously amended) The ultrafine crystal layer forming process according to claim 16,

wherein the drilling operation using the drill is performed such that a material temperature at a non-ultrafine crystal layer is held at least about 500 C° for a time not longer than about 1 second, for providing the non-ultrafine crystal layer with a hardness that is about 80 % as high as a hardness of a substrate of the workpiece,

and wherein the non-ultrafine crystal layer is configured by at least one of (i) a lower layer portion that is located on an inner side of the surface layer portion as a machined surface layer portion and (ii) another surface layer portion that is located in neighborhood of the machined surface layer portion.

23. (previously amended) The ultrafine crystal layer forming process according to claim 40,

wherein the drilling operation using the drill is performed such that a material temperature at a non-ultrafine crystal layer is held at least about 500 C° for a time not longer than about 1 second, for providing the non-ultrafine

crystal layer with a hardness that is about 80 % as high as a hardness of a substrate of the workpiece,

and wherein the non-ultrafine crystal layer is configured by at least one of (i) a lower layer portion that is located on an inner side of the surface layer portion as a machined surface layer portion and (ii) another surface layer portion that is located in neighborhood of the machined surface layer portion.

24. (previously canceled)

25. (previously canceled)

26. (previously canceled)

27. (previously canceled)

28. (previously canceled)

29. (previously canceled)

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31. (previously canceled)

32. (previously canceled)

33. (previously canceled)

34. (previously canceled)

35. (previously canceled)

36. (previously canceled)

37. (previously canceled)

38. (previously canceled)

39. (previously canceled)

40. (currently amended) A process of forming an ultrafine crystal layer in a workpiece constituted by a metallic material, said process comprising:

performing a drilling operation on a machined surface of the workpiece using a drill, so as to impart a large local strain to the machined surface of the workpiece,

wherein said drilling operation using said drill causes the machined surface of the workpiece to be subjected to a plastic working with a true strain of at least 1, such that said ultrafine crystal layer is formed in a surface layer portion of the workpiece that defines the machined surface of the workpiece;

wherein, in the drilling operation, when hardness H of the workpiece W is lower than 500 [Hv], a peripheral velocity V of the drill D is higher than (175 - H / 4) [m/min] and a feed amount of the drill per one revolution is smaller than ~~0.03 mm~~ 0.3 mm, and when the hardness H of the workpiece W is higher than 500 [Hv], the peripheral velocity V of the drill D is higher than 50 [m/min] and the feed amount of the drill D per one revolution is smaller than ~~0.03 mm~~ 0.3 mm; and

wherein said drilling operation using said drill is performed on the surface of the workpiece that is constituted by a non-steel material as the metallic material, with a material temperature at the machined surface of the workpiece being held in a range which is higher than substantially half

a melting point of the non-steel material and is lower than the melting point of the non-steel material, where said material temperature and said melting point are expressed in terms of absolute temperature.